CONTENTS

FIGURES

TABLES

12. WAG 10, OU 10-03, ORDNANCE AREAS, INCLUDING OU 10-05 INTERIM ACTION SITES

This section includes an overview of ordnance areas, followed by a short subsection describing the two main risks from unexploded ordnance (UXO) areas, which are (1) uncontrolled detonation of UXO, and (2) long-term exposure to explosive residues or explosive contaminated soil. Areas of concern may include both UXO and soil contamination, while others contain only UXO or only soil contamination. Also, some ordnance areas contain neither UXO nor soil contamination but have had either UXO or explosive residues removed or contain only jagged pieces of iron or "frag."

12.1 Overview of INEEL Ordnance Areas

The term *ordnance* refers to military equipment or apparatus. *Explosive ordnance* is any munition, weapon delivery system, or ordnance item that contains explosives, propellants, or chemical agents. UXO refers to these same items after being (1) armed or otherwise prepared for action; (2) launched, placed, fired, or released in a way that they cause hazards; or (3) unexploded either through malfunction or design (Sherwood et al. 1998).

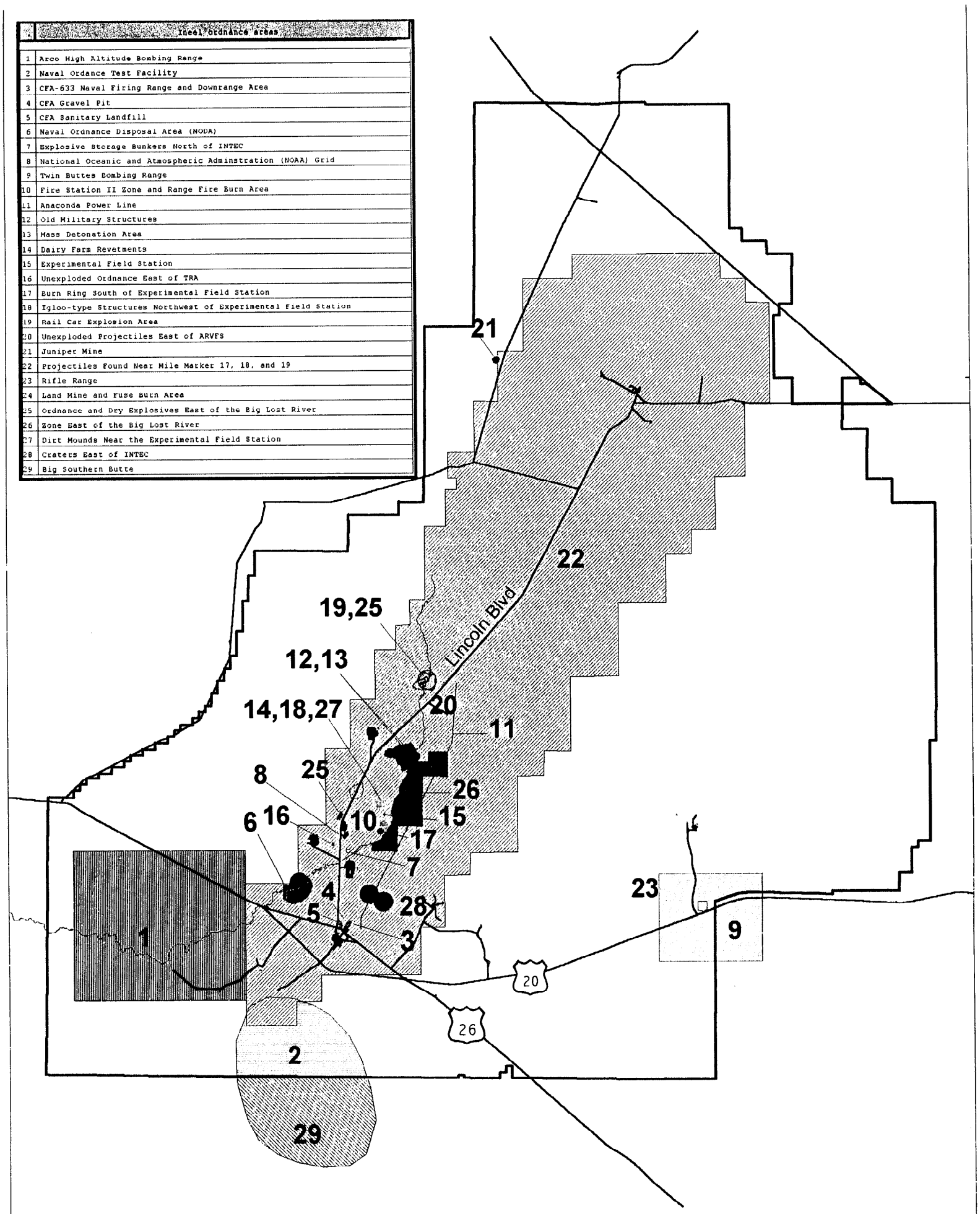
Most ordnance, UXO, and ordnance-related areas at the Idaho National Engineering and Environmental Laboratory (INEEL) result from activities conducted at the Naval Proving Ground in the 1940s. To date, a total of 29 ordnance areas have been identified on the INEEL (Figure 12-1) and are listed in Table 1-1 of the operable unit (OU) 10-04 remedial investigation (RI)/feasibility study (FS) Work plan (U.S. Department of Energy Idaho Operations Office [DOE-ID] 1999a). Table 12-1 summarizes information on each of these areas. The Big Southern Butte area was eliminated from further consideration in the OU 10-04 RI/FS Work plan (DOE-ID 1999a) and will not be discussed in this RI/FS. The following paragraphs present a brief history of the ordnance areas.

Between 1942 and 1950, approximately 1,650 minor (3 to 5-in.) and major (16-in.) guns were tested at the Naval Proving Ground (Figure 12-1). Most of the projectiles were nonexplosive. Experimental and test work was also preformed, primarily in mass detonations. During these large mass detonation tests, hundreds of thousands of pounds of explosives in land mines, smokeless powder, and bombs were placed in explosives storage bunkers or open sites and detonated to determine the effects on collocated bunkers and facilities. Stacks of ammunition were shot with high explosive projectiles to test their susceptibility to enemy fire. As a result of the Naval Proving Ground activities, many projectiles (explosive and inert), explosive materials, pieces of explosives, UXO, Naval Proving Ground structures, and debris remain. These materials are obvious in some locations, such as at the Rail Car Explosion Area. In other locations, such as in large portions of the CFA-633 Downrange Area, the materials are difficult to find.

Activities during World War II also included practice aerial bombing at two bombing ranges established by the U.S. Army Air Corps. The Arco High Altitude Bombing Range was located adjacent to the southwest end of the Naval Proving Ground (see Figure 12-1); the Twin Buttes Bombing Range was located east of the southern end of the Naval Proving Ground, near the present-day Argonne National Laboratory-West (ANL-W) complex.

In 1950, the 69,808.58 ha (172,494.65 acres) that composed the Naval Proving Ground were transferred from the Navy to the Atomic Energy Commission (AEC) for use as a nuclear reactor testing site. The AEC also acquired, through public land withdrawals, lands surrounding the Naval Proving Ground, including the two former bombing ranges.

#	INEEL Ordnance Areas
1	Arco High Altitude Bombing Range
2	Naval Ordance Test Facility
3	CFA-633 Naval Firing Range and Downrange Area
4	CFA Gravel Pit
5	CFA Sanitary Landfill
6	Naval Ordnance Disposal Area (NODA)
7	Explosive Storage Bunkers North of INTEC
8	National Oceanic and Atmospheric Adminstration (NOAA) Grid
9	Twin Buttes Bombing Range
10	Fire Station II Zone and Range Fire Burn Area
11	Anaconda Power Line
12	Old Military Structures
13	Mass Detonation Area
14	Dairy Farm Revetments
15	Experimental Field Station
16	Unexploded Ordnance East of TRA
17	Burn Ring South of Experimental Field Station
18	Igloo-type Structures Northwest of Experimental Field Station
19	Rail Car Explosion Area
20	Unexploded Projectiles East of ARVFS
21	Juniper Mine
22	Projectiles Found Near Mile Marker 17, 18, and 19
23	Rifle Range
24	Land Mine and Fuse Burn Area
25	Ordnance and Dry Explosives East of the Big Lost River
26	Zone East of the Big Lost River
27	Dirt Mounds Near the Experimental Field Station
28	Craters East of INTEC
29	Big Southern Butte



Overview of Ordnance Sites

Idaho National Engineering and Environmental Laboratory

Legend

- INEEL Boundary
- Selected Roads
- Big Lost River
- Arco High Altitude Bombing Range
- NOTF
- Twin Buttes Bombing Range
- Big Southern Butte
- Naval Downrange Area

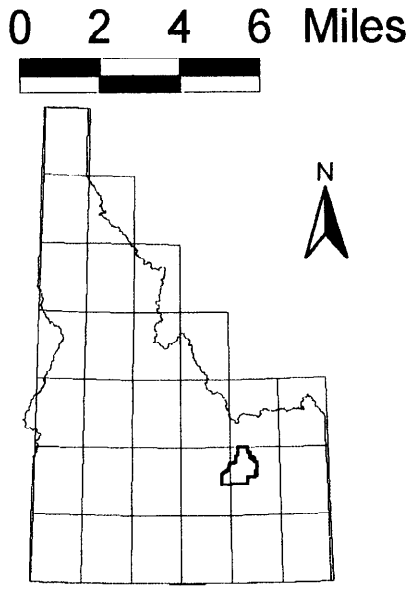


Figure 12-1. Overview of ordnance sites.

Table 12-1. Ordnance areas identified in the OU 10-04 Work plan (DOE-ID 1999a).

Area Name	UXO Found (Y/N)	Soil Contamination (Y/N)	Summary of Previous Investigations (from Sherwood et al. 1998)
Arco High-Altitude Bombing Range	N	N	Surface search found only inert practice bombs, spotting charge canisters, and initiators (1996 field assessment)
Naval Ordnance Test Facility	N	N	Surface search to southern INEEL boundary (1996 field assessment) identified no UXO or soil contamination
CFA-633 Naval Firing Range and Downrange Area	Y	Y	20 acres cleared of UXO to 2 ft; soil contamination identified (1993 Interim Action); surface search found only inert projectiles in downrange area (1996 field assessment)
CFA Gravel Pit	N	N	Visual and geophysical search (1993 Interim Action) identified no UXO or soil contamination
CFA Sanitary Landfill Area	N	N	Geophysical search to 2 ft; small amount of trinitrotolulene (TNT) removed (1994 Remedial Action); surface search 1995
Naval Ordnance Disposal Area (NODA)	Y	Y	32+ acres cleared of UXO to 4 ft (1994 Remedial Action); 22+ acres cleared of UXO to 2 ft 1995; UXO and soil contamination identified (1996 field assessment)
Explosive Storage Bunkers North of Idaho Nuclear Technology and Engineering Center (INTEC)	N	N	10 acres cleared of UXO to 2 ft (1993 Interim Action); surface search (1996 field assessment) identified no UXO or soil contamination
National Oceanic and Atmospheric Administration (NOAA) Grid	N	Y	6+ acres cleared of UXO to 2 ft (1993 Interim Action); soil contamination identified (1996 field assessment)
Twin Buttes Bombing Range	Y	N	90 acres cleared to 4 ft (1994 Removal Action); surface search found inert practice bombs, unexploded flare (1996 field assessment)
Fire Station II Zone and Range Fire Burn Area	N	Y	10 acres cleared of UXO to 2 ft (1993 Interim Action); soil contamination identified (1996 field assessment)
Anaconda Power Line	Y	N	100 ft cleared of UXO to 2 ft along 10-mi length (1993 Interim Action); surface search (1996 field assessment) identified no UXO or soil contamination
Old Military Structures	N	N	Surface search (1996 field assessment) identified no UXO or soil contamination
Mass Detonation Area	Y	Y	UXO cleared prior to demolition operations (1993 Interim Action); UXO and soil contamination identified (1996 field assessment)
Dairy Farm Revetments	N	N	Surface search (1996 field assessment) identified no UXO or soil contamination
Experimental Field Station	Y	Y	UXO and soil contamination identified (1996 field assessment)

Table 12-1. (continued).

Area Name	UXO Found (Y/N)	Soil Contamination (Y/N)	Summary of Previous Investigations (from Sherwood et al. 1998)
Unexploded Ordnance East of the Test Reactor Area (TRA)	Y	Y	UXO removed (1996 Removal Action); soil contamination identified (1996 field assessment)
Burn Ring South of Experimental Field Station	N	?	1995 site survey; 1996 field assessment indicated possible soil contamination not related to UXO
Igloo-type Structures Northwest of Experimental Field Station	N	N	1996 field assessment identified no UXO or soil contamination
Rail Car Explosion Area	Y	?	Geophysical search; surface UXO cleared (1996 removal action); soil sampling not completed (1996 field assessment)
Unexploded Projectiles East of Army Reentry Vehicle Facility Site	N	N	Surface search found only inert projectiles (1996 field assessment)
Juniper Mine	Y	Y	Presence of explosives not verified; institutional controls recommended (1996 field assessment)
Projectiles Found Near Mile Marker 17, 18, and 19	N	N	Projectiles "demilitarized" (1993 Interim Action; 1994 Removal Action)
Rifle Range	N	N	Surface search (1996 field assessment) identified no UXO or soil contamination
Land Mine and Fuze Burn Area	Y	Y	1.5 acres cleared to 2 ft; 20 acres surface cleared (1996 removal action)
Ordnance and Dry Explosives East of the Big Lost River and North of the Naval Reactor Facility (NRF)	—	—	(Included in Rail Car Explosion Area)
Zone East of the Big Lost River	N	N	Portion overlapping Anaconda Power Line cleared (1993 Interim Action); remainder in CFA-633
Dirt Mounds Near Exp. Field Station	N	N	1996 field assessment identified no UXO or soil contamination
Craters East of INTEC	N	?	Surface search indicated soil contamination; sampling not completed pending recommended subsurface clearance of ordnance (1996 field assessment)
Big Southern Butte	N	N	Area was eliminated from further consideration in OU 10-04 RI/FS Work plan (DOE-ID 1999a)

In 1968, the Naval Ordnance Test Facility was established at the south end of the former Naval Proving Ground. The Navy used this facility after the Naval Proving Ground had been transferred to the AEC. The Naval Ordnance Test Facility was a temporary facility used to test 16-in. guns, which fired inert projectiles at the Big Southern Butte.

Between about 1980 and 1985, the Naval Ordnance Disposal Site, which had been used in the late 1940s as a disposal site, treated hazardous waste by open burning under Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Act (HWMA) regulations.

12.2 Overview of Risks from Ordnance Areas

Two main risks are associated with the INEEL ordnance areas. The first main risk is the acute, or short-term, risk of an uncontrolled detonation of UXO. Some of the known ordnance locations are near areas frequented by INEEL personnel. Encounters with UXO are relatively common, and the potential remains for future encounters. The risk posed by UXO detonation could be great, depending on the type and amount of UXO present and how the property is or may be used. The second main risk comes from soil contamination by explosive residues. The two main compounds found at INEEL UXO areas are hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) and 2,4,6-TNT. Although some acute risks, such as skin rash, are associated with handling TNT and RDX (royal demolition explosive), the main risks are from chronic, or long-term, exposure. The Environmental Protection Agency lists both TNT and RDX as possible human carcinogens, and some of their degradation products are listed as probable carcinogens. The exposure pathways are through dermal absorption, ingestion, and inhalation. The chunks of TNT and, especially, the RDX do not appear to have degraded a great deal since the 1940s. Some soil staining is evident near the TNT, but none near the (RDX), which still retains the shape of the bomb from which it was ejected.

The TNT exists as chunks of weathered crystals, tiny crystals embedded in the soil matrix, and TNT molecules adsorbed on the soil surface. The large chunk of neat (pure) TNT materials pose a detonation hazard, though there is little risk from casual contact, such as stepping on it. Though these large and small TNT crystals in the soil serve as a continued contamination source, the solubility of TNT is low. The fate and transport of TNT and RDX are discussed in Appendix F.

Risks from UXO and soil contamination areas at the INEEL are discussed separately in Sections 12.3 and 12.4, respectively.

12.2.1 UXO Risks

All sites that contain UXO present some degree of risk. For human/UXO contact, risk may be evaluated in terms of three main components or events: (1) UXO encounter, (2) UXO detonation, and (3) consequences of UXO detonation.

A UXO encounter considers the likelihood that a person will come across UXO and will influence the UXO through some level of force, energy, motion, or other means. A UXO detonation is the likelihood that a UXO will detonate once an encounter has occurred. Consequences of UXO detonation encompass a wide range of possible outcomes or results, including bodily injury or death, health risks associated with exposure to chemical agents, and environmental degradation caused by the actual explosion and dispersal of chemicals to air, soil, surface water, and groundwater. Though UXO encounters are relatively common, casual human contact has never caused a detonation at the INEEL.

UXO does not pose a risk to ecological receptors. Encounters ecological receptors may have with UXO are typically brief, and detonation does not occur from casual contact. As with human contact, no known accidental detonations have been caused at the INEEL by contact with ecological receptors.

12.2.2 Explosives Residuals and Soil Contamination Risks

The effect of exposure to TNT and RDX depends on the dose received, the weight and health of the exposed person, the route of exposure, and other factors. Although UXO encounters are relatively common at the INEEL, the locations where TNT, RDX, and other chemicals exist are generally not frequented, so there are few or no incidental exposures occurring. However, TNT and RDX do exist, and both have chemical hazards and associated risks from exposure. For example,

- Residual explosives and contaminated soil can be toxic when inhaled, ingested, or absorbed through the skin
- Skin contact with explosives like TNT can cause a skin rash, which is the most frequently reported effect from working with or contacting explosives
- Chronic exposure to TNT or RDX can result in unacceptable health risks, such as cancer.

The above effects are usually observed in people who are in daily contact with TNT or RDX, as in a munitions factory. At the INEEL, however, the frequency of exposure and the size of the dose (if any) is such that the risk from casual human contact is extremely low.

12.3 UXO Sites

12.3.1 Previous Investigations

UXO was cleared and field-assessed at several ordnance areas during each field season from 1993 through 1997. *The Preliminary Scoping Track 2 Summary Report for OU 10-03 Ordnance* (Sherwood et al. 1998) summarizes the history of investigations and remedial actions performed prior to January 1997 for the 29 identified ordnance areas at the INEEL. The removal action that occurred in 1997 is documented in the *Summary Report for the 1997 Non-Time Critical Removal Action* (Sherwood 1999a). In 1999, soil samples were collected from several of the ordnance areas per the *Field Sampling Plan for Operable Unit 10-04 Explosive Compounds* (Sherwood 1999b). The results from that sampling event are documented in Section 12.4 of this RI/FS. In 2000, a UXO walkdown was conducted at several ordnance sites to better define the extent of UXO.

12.3.1.1 Experimental Field Station. In 1996, the field team encountered remnants of World War I and World War II vintage bombs and two areas of widespread heavy concentrations of explosive-contaminated soils. One area was approximately 0.8 ha (2 acres) in size. The second area was approximately 0.3 ha (0.8 acres) (see map in Appendix H). The assessment included a visual examination for signs of craters, detonation tests, surface UXO, pieces of explosives, and soil contamination. The area was searched for UXO using 10-m (32.8-ft) sweeps. When the team encountered fields of TNT contamination, the area was examined in great detail, and the area was mapped. Several large craters were located in this area. No ordnance was found in any of the craters. The craters appear to have resulted from ordnance destruction or ordnance testing. Approximately 2.4 km (1.5 mi) away, the nose section of a World War I vintage bomb with TNT and an empty tail section of a World War I vintage bomb were found during the assessment and transported by the 1996 removal action contractor to the Mass Detonation Area for disposal by detonation. Nineteen samples were collected and analyzed from

the TNT-contaminated soil areas (DOE-ID 1999a). In 1999, surface soil samples were collected as described by Sherwood (1999b).

12.3.1.2 Land Mine and Fuze Burn Area. During the 1996 field assessment, the perimeter was established, and the area for the removal action was defined (see map in Appendix H of DOE-ID 1997). The subsurface was geophysically characterized during a technology demonstration project in June 1996. Approximately 0.6 ha (1.5 acres) were surveyed to a depth of 0.61 m (2 ft), and the area was mapped (DOE-ID 1997).

During the 1996 removal action, 8.1 ha (20 acres) were surface cleared, geophysically characterized, and mapped. A subsurface clearance was not performed based on the removal action subcontractor's evaluation of the data. However, during the INEEL quality check of the subsurface of this site, several inert items were found and excavated (DOE-ID 1997).

In 1999, surface soil samples were collected as described in the *Field Sampling Plan (FSP) for Operable Unit (OU) 10-04 Explosive Compounds* (DOE-ID 1999b).

12.3.1.3 Mass Detonation Area. Prior to demolition operations during the 1993 interim action and the 1994, 1995, and 1996 removal actions, the demolition pit of the Mass Detonation Area was searched for UXO, and several were found. In addition, demolition area signs were posted every year, and the post hole area was surveyed prior to placement (DOE-ID 1997).

12.3.1.4 Rail Car Explosion Area. During the 1996 field assessment, the entire area was walked at 50-m (164-ft) intervals. The boundary of the mapped area was established at the last piece of fragmentation located.

During the 1996 removal action, an 8.1-ha (20-acre) test strip extending south from the detonation pit was cleared of surface ordnance and fragmentation. The 8.1-ha (20-acre) strip was then mapped, and some of the anomalies were excavated (DOE-ID 1997).

One live 12.7-cm (5-in.) projectile was found approximately 15 cm (6 in.) below the surface in the 8.1-ha (20-acre) area during the 1996 removal action. About 1,928 kg (4,250 lb) of scrap metal and 11 kg (25 lb) of bulk explosive, mostly RDX and some TNT (see Photographs 4 through 8 in DOE-ID 1997/Appendix L), were removed. Two live, 12.7-cm (5-in.) projectiles were removed from the dry riverbed of the Big Lost River. All three projectiles and the bulk explosives were removed to the Mass Detonation Area and disposed of by detonation during the 1996 removal action. Two inert seamines (depth charges) were located on the east side of the Big Lost River bed at the Rail Car Explosion Area before the 1996 removal action (DOE-ID 1997).

In 1999, surface soil samples were collected as described in the *Field Sampling Plan (FSP) for Operable Unit (OU) 10-04 Explosive Compounds* (DOE-ID 1999b).

12.3.1.5 Naval Ordnance Disposal Area (NODA). During the 1994 removal action, 11.7 ha (28.92 acres) were cleared of ordnance and pieces of explosives to a depth of 1.2 m (4 ft). An additional 1.6 ha (3.89 acres) were cleared to a depth of 1.2 m (4 ft) from Lincoln Boulevard to the NODA to accommodate an access road. Because of the lack of information pertaining to tests performed in the pits at the NODA site, none of the pits were addressed during the 1994 removal action. The removal action was continued during the summer of 1995, when an additional 9.1 ha (22.56 acres) were cleared to a depth of 0.61 m (2 ft). The depth was reduced to 0.61 m (2 ft) from 1.2 m (4 ft) based on the results of the 1994 removal action. At that time, five pits were remediated. Two pits were remediated with a remote excavator; two pits were remediated with a backhoe; and one pit was hand excavated. The pits

were excavated until the geophysical search determined there were no additional anomalies (DOE-ID 1997).

12.3.2 Nature and Extent of Contamination

Table 12-1 summarizes the results of previous investigations and remediation activities at the 29 ordnance areas (discussed by Sherwood et al. [1998]). No evidence of UXO or soil contamination had been identified in previous investigations for 14 of the 29 areas. However, in some cases, these investigations were limited to only surface searches. Subsurface investigations using geophysical techniques were conducted on some areas, but these were typically limited in areal extent and to depths of 0.6 m (2 ft) or 1.2 m (4 ft). Therefore, the possibility of subsurface UXO existing in some areas cannot be ruled out.

Five of the remaining areas have confirmed UXO, as follows:

- Naval Ordnance Disposal Area—This area was a demolition area for a large variety of ordnance items. An 8-in. projectile, Mk 25 Mod 1, was the largest ordnance item found during the two removal actions. The large number of items removed during two previous actions indicate the potential for fuzes, projectiles, and grenades to be present in this area (Sherwood 1998).

- Mass Detonation Area—Heavy ordnance or explosive contamination at this site is not visually evident, despite the extensive explosive testing that occurred there. Historical documentation indicates potential for land mines, bombs, bulk high explosive, and bulk smokeless powder in this area (Sherwood 1998).

- Experimental Field Station—This area has pieces of explosives scattered across a wide area. During the site inspections, 500-lb bomb casings and foreign bomb casings were found. It is very likely that live ordnance items are present in this area (Sherwood 1998).

- Rail Car Explosion Area—A mix of Amatol-loaded bombs and TNT-loaded Navy mines were used in the rail car detonation. The scattered white explosives (RDX) found at the site most likely originated from two small craters near the rail car crater. Large fragments of 5- and 8-in. projectiles with the explosive still in them can be found in and near both of the small craters. Historical documents indicate potential for bombs and Navy mines to be present in this area (Sherwood 1998).

- Land Mine and Fuze Burn Area—The fuzes found to date are M1A1, M1A2, and M4 land mine fuzes, a number of which still had intact detonators. These fuzes require 500-lb pressure on the pressure plate to function the fuze, but they may be functioned by a weight of 10 lb dropped from a height of 24 in. (Sherwood 1998). Although a removal action was performed here in 1996 and 1997, additional land mine fuzes are likely to be present.

In summary, multiple types of ordnance and explosives have been recovered from each INEEL ordnance site. To date, approximately 2,360 live items (UXO) have been removed and detonated, 310 kg (685 lb) of TNT and RDX have been removed and detonated; 90,000 kg (198,500 lb) of total scrap have been removed and landfilled; and 185 yd^3 of contaminated soil has been incinerated (Sherwood 1998). As mentioned above, UXO remains at the Naval Ordnance Disposal Area, the Mass Detonation Area, the Experiment Field Station, the Railcar Explosion Area, and the Land Mine and Fuze Burn Area, and more UXO items are found intermittently both at known and at previously unidentified sites.

The OU 10-04 RI/FS Work Plan (DOE-ID 1999a) includes the Juniper Mine as an ordnance site for evaluation in this RI/FS, because previous investigations did not evaluate risk from potential groundwater contamination or ecological risks. The Juniper Mine was used in 1974 to conduct seismic tests using high explosives. Four of the five explosions detonated during the tests occurred in the vertical shaft of the Juniper Mine. The high explosive used, called IREGEL 376, contained ammonium nitrate as its primary ingredient. One test detonation, designated HE-3 and occurring on September 18, 1974, apparently failed, leaving approximately 7,258 kg (16,000 lb) of high explosives buried in the mineshaft at a depth of 29 m (95 ft). A subsequent test detonation at a depth of 18 m (59 ft) on October 17, 1974 apparently failed to detonate the HE-3 charge (Navarro 1975). Up to six 1-lb trinitrotoluene (TNT)-based explosive boosters and an undetermined amount of severed detonation cord may also remain (Richard Green, BBWI, personal communication, 5/30/01).

The high explosives remaining in the Juniper mineshaft are located at a depth of approximately 29 m (95 ft). The mineshaft has been backfilled to the surface. The Track 2 report (DOE/ID-10566) concludes that even if the entire mass of residual explosives could be detonated, "a hazard would not be produced above the ground, because of the amount of soil in the shaft and the depth of the explosives." The IREGEL 376 vendor[1] stated that the explosive would likely not detonate even if the remaining boosters were detonated.The vendor also stated that it is unlikely the explosive would detonate if struck by a drill bit, excavator, etc. However, the boosters would likely remain capable of detonation indefinitely and could be set off if struck by a drill bit or excavator. In this scenario, drilling tools could potentially be damaged or ejected from the hole, injuring drillers at the surface.

The depth to groundwater in the area is approximately 126 m (413 ft), measured in United States Geological Survey (USGS) wells 126A and 126B, located approximately 3 km (5 mi) north-northeast of the Juniper Mine. The mineshaft apparently terminates at the water table. The mineshaft and upper aquifer in this area are located in rhyolite, which typically is less fractured than basalt and therefore is likely to be less transmissive. The potential for groundwater contamination by nitrate, the only regulated constituent present in the IREGEL 376 [based on the composition reported by Navarro (1975)] was evaluated using GWSCREEN (Rood, 1998). Transport of nitrate from the reported location of HE-3 to groundwater was modeled using conservative parameters. Results presented in Appendix M show no groundwater concentrations of nitrate in the upper aquifer directly below the mine shaft greater than the MCL of 10 mg/L. Therefore, no human health risk exists from exposure to groundwater.

Because the explosives were placed 29 m (95 ft) bgs, and the mineshaft has been backfilled with earthen material, no pathway exists for exposure to ecological receptors. Human health risks from groundwater exposure were determined to be within allowable levels. Therefore, the Track 2 assessment for Juniper Mine (No Action with institutional controls) is supported. Recommended institutional controls include signs notifying potential site users that explosives may remain underground and deed notification of the potential presence of explosives in the event the property is transferred. This site will not be evaluated further in this RI/FS.

Because the OU 10-04 RI/FS Work Plan (DOE-ID 1999a) eliminated Big Southern Butte as an area of concern, the Naval Ordnance Test Facility can also be eliminated. As documented in Sherwood et al. (1998), only inert projectiles were fired at Big Southern Butte from the Naval Ordnance Test Facility. Therefore, the only ordnance likely to exist at the Naval Ordnance Test Facility are inert projectiles, not UXO. Moreover, surface investigations have identified no evidence of UXO or soil

---

1. Patrick S. Weber, Dyno Nobel, personal communication 5/29/01

contamination (Sherwood et al. 1998). Therefore, the Naval Ordnance Test Facility is recommended for no further action and is not evaluated further in this RI/FS.

12.3.3 Risk Assessment

The interim guidance recently developed for assessing UXO risk under the U.S. Department of Defense (DOD) Range Rule (DOD 2000) was reviewed for applicability to INEEL UXO areas. WAG 10 managers determined that insufficient data existed on OU 10-04 UXO areas to enable risk assessment using the DOD guidance. Therefore, no risk assessments were performed for confirmed UXO areas.

12.3.3.1 Human Health. No human health risk assessemnts were performed for these areas.

12.3.3.2 Ecological. No environmental risk assesment (ERA) was performed for these areas.

12.3.3.3 Native American. The INEEL is within the aboriginal territories of the Shoshone-Bannock Tribes. A wide variety of natural and cultural resources and areas that directly reflect tribal cultural heritage and native landscape ecology are preserved at the INEEL. These resources are important in maintaining tribal spiritual and cultural values and activities, oral tradition and history, mental and economic well being, and overall quality of life.

Ordnance activities have affected a variety of Shoshone-Bannock tribal resources at the INEEL, though none of these impacts are specifically called out in the tribal report (Appendix A). During field tours of several ordnance sites in March and May 2000, tribal elders and Risk Assessment Committee members did provide some verbal feedback on perceived impacts and long-term effects. Some of these impacts were direct, as reflected in the comments of one tribal elder who recalled the loud noises and explosions that emanated from the Arco desert in the 1940s and was certain that these activities had influenced game migration routes through the area. Other perceived effects were less personal, but equally significant. Tribal members repeatedly expressed concern about the intentional targeting of Big Southern Butte, a sacred site to the Shoshone-Bannock Tribes, during use of the Naval Ordnance Training Facility gun mounts in the 1960s. These concerns persist, in spite of the fact that no live rounds were ever fired at the Butte. Tribal tour participants also expressed concerns about being exposed to live rounds and other explosive materials, and about the impacts of ordnance and associated contamination on important plants such as those that were observed at the Juniper Mine during one of the tours. The proximity of several ordnance areas to the Big Lost River, a zone important to prehistoric Native American people, as evidenced by the wide variety of archaeological resources located there, certainly heightens the potential impacts of WAG 10 ordnance sites on Shoshone-Bannock concerns.

WAG 10 is taking a positive first step toward addressing tribal concerns by retaining ordnance sites that present a risk of uncontrolled detonation and exceed threshold risk levels for human health and the environment from soil contamination for further evaluation and ongoing monitoring.

12.3.4 Uncertainties

Because subsurface investigations were not conducted for some UXO areas, or were limited in areal extent and depth, there are insufficient data to determine whether UXO hazards remain at some OU 10-04 areas. These include the Arco High-Altitude Bombing Range, the Twin Buttes Bombing Range, and areas associated with the Naval Proving Ground.